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Compilation of natural gas statistics

Report of the Secretary-General

Summary

The present report contains a review of international activities in the collection and compilation of statistics on natural gas and an overview of the main problems that countries and organizations face in that area. The report also contains an outline of the work programme that the Statistics Division, in cooperation and coordination with other international and regional organizations, intends to undertake to improve annual and monthly collections on natural gas statistics. The Statistical Commission is invited to express its views on the assessment of the current situation and the proposed activities.

Points for discussion by the Commission are set out in paragraph 32 of the report.

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I. Introduction

1. The adoption of the International Recommendations for Energy Statistics by the Statistical Commission at its forty-second session, held from 22 to 25 February 2011, has set the basis for the improvement of official energy statistics by harmonizing concepts and definitions and developing the Standard International Energy Product Classification. Additional guidance on more practical and technical matters to assist countries in implementing the recommendations set out in the International Recommendations is being developed in the Energy Statistics Compilers Manual. While the International Recommendations cover all energy statistics, some areas deserve increased attention due to their importance and warrant a more detailed or frequent data collection than what is recommended as a minimum data set in the International Recommendations. One of the areas relates to natural gas statistics and the need to further elaborate the recommendations to improve their quality and availability.

2. There is a need for more detailed, timely and reliable statistics on natural gas in order to accurately monitor the current situation and provide policymakers, analysts and other users with relevant information. This is due to the increasing importance of natural gas as an energy source at the global level, the complexity of the gas market due to the increased demand for and trade of natural gas, and the need for accurate data on the estimation of greenhouse gas emissions. Detailed monthly data collections on crude oil and oil products, another major energy source, are already being made through the Joint Organisations Data Initiative. Considering the importance of natural gas, a similar approach may be undertaken for this energy source. The present report assesses the current status of natural gas statistics and proposes actions to improve their availability, coverage and timeliness.

3. Section II of the report contains more background on the need for natural gas statistics; section III provides an overview of the main challenges in the collection and compilation of natural gas statistics; section IV contains a review of the activities on natural gas statistics at the international level; and section V sets out an outline of the proposed activities for improving the availability and quality of natural gas statistics. Section VI contains points for discussion by the Commission.

4. The report has been prepared with support from Statistics Norway, the International Energy Agency and Eurostat. Their comments and contributions are thankfully acknowledged. The report also draws on information published in the World Energy Council's *2010 Survey on Energy Resources*, the International Energy Agency's *World Energy Outlook 2010* and a study report on natural gas statistics commissioned by the International Energy Forum in 2009.

II. Importance of high-quality statistics on natural gas

5. Natural gas is considered one of the cleanest and most efficient fossil fuels and is becoming an increasingly important form of energy because of its role in helping to meet environmental challenges and mitigate climate change. The production and consumption patterns of natural gas are evolving both at the national and international levels due to two main driving forces: on the one hand, with growing concerns about climate change and increasing greenhouse gas emissions through the use of different energy products, natural gas is often a viable alternative compared

with other fossil fuels because of its much lower carbon content; on the other hand, the availability of natural gas is plentiful and expected to grow.

6. Overall, the demand for natural gas has steadily increased in the past 20 years. In 2009, the global demand for natural gas was more than 50 per cent higher than in 1990. It is expected that global demand will further increase in the next 20 years. While this trend is observed across all regions (Africa, North and South America, Asia, Europe and Oceania), it is particularly strong in Asia owing to the sharp increase in demand of China and India.

7. In terms of sectoral trends in demand, the use of natural gas for power generation is expected to continue to increase, and that sector is expected to lead the demand for natural gas in most regions. In addition, because of the higher thermal efficiency of some types of gas power stations, such as combined cycle gas turbines, natural gas presents definite environmental advantages over other fossil fuels, such as coal and oil. Further development of carbon capture and storage technology will lower emissions from gas power plants and make natural gas an even more environmentally friendly alternative. While still very limited at present, the demand for natural gas as feedstock in gas-to-liquids plants is also expected to increase rapidly due to the recent increases in capacity of such plants, which convert natural gas into liquid fuels as alternative to the traditional refining of crude oil.

8. The final sector in which demand for natural gas is expected to grow is the industry sector. The *World Energy Outlook 2010* contains forecasts of a 1.3 per cent annual increase in industrial demand for natural gas from 2008 to 2035. Major uses of natural gas in the industry sector include as feedstocks in energy transformation plants and the non-energy use of fertilizer production. Also, the use of natural gas as a road transport fuel, although still limited in terms of total final demand, is expected to grow in a number of countries. While that use is not likely to become significant on a global scale (in 2009 it amounted to about 1 per cent of the total final consumption of natural gas) since it requires the establishment of infrastructure and adaptation of vehicles to a different fuel, it is certainly a growing trend that needs to be accurately monitored. Finally, the consumption of natural gas in household, commerce and public service activities is also expected to grow in selected countries. While for many developed countries there is a saturation effect in the use of gas to heat water and space, a rapid growth in the use of gas in buildings is expected in selected developing countries.

9. In the past 20 years, there has been a steady increase in the trade of natural gas as measured by total exports. That is partly due to the asymmetry between countries with regard to their production and use of natural gas. Some countries export large quantities, while others rely heavily on imports for their own final demand for natural gas. In addition, the increase in liquefaction capacity has also brought an increase in the trade of liquefied natural gas, which makes it more cost-effective to transport natural gas over long distances where pipelines do not exist. Once transported, liquefied natural gas is regasified and distributed as pipeline natural gas. This has changed the overall market. The asymmetry also underlines the need for statistics from all countries, not just major producers, to be collected in order to obtain a complete picture of the production, trade and different uses of natural gas.

10. The existence of reliable information on stocks of natural gas is particularly important for energy security and planning at the national, regional and international levels. Such information makes it easier to take informed decisions on national

storage systems and to develop measures for the security of gas supplies, such as minimum standards, crisis measures and supply contracts.

11. In terms of reserves/resources, the availability of natural gas in the environment is sufficiently abundant to cover global gas demands for many decades. While most of the reserves/resources consist of conventional gas, an increasing proportion constitutes unconventional gas, including shale gas, coal bed methane and tight gas.

12. As indicated above, statistics on all aspects of natural gas are also used as input data for energy balances, the System of Environmental Economic Accounts for Energy and the System of National Accounts. Improvements in their quality, availability and consistency will also benefit the quality of statistical tabulations at the national and international levels.

13. The strong interest in detailed information on natural gas and associated flows for the evaluation of gas markets and developments at the global level creates additional needs for such statistics not only on an annual basis, but also on a more frequent, monthly basis.

III. Main challenges

14. The International Recommendations for Energy Statistics have set the basis for the development of official energy statistics by harmonizing the concepts, definitions, classifications and methods for their collection and compilation. However, certain issues pose intrinsic challenges for natural gas, indicated below, and call for additional and specific guidelines to be introduced in order to ensure the quality of the statistics produced.

15. **Measurement issues**. While there is international agreement that natural gas should be collected in volume units such as cubic metres and also in energy units such as joules, there are some elements that may affect the comparability of information, such as the temperature and pressure conditions under which measurements and reportings are taken; the use of gross or net calorific values in the collection and reporting of natural gas statistics when converting to energy units; or the measurement point for the production of natural gas, for example dry versus wet output of processing plants, which may differ in certain countries. The International Recommendations for Energy Statistics provide a number of recommendations on measurement issues, but there is a need to focus on the consistent application of the recommendations in order to ensure international comparability of the statistics.

16. **International trade**. In order to understand the international trade of natural gas, it is important to have information on the country of ultimate origin and destination for the assessment of national energy security. However, such information is generally not easy to identify owing to the complex and extensive network of cross-border pipelines that transport natural gas between non-contiguous countries. The transportation of liquefied natural gas by ship poses an additional problem, since the country of destination may not be known on departure. Information on the volume of gas entering and exiting a country can be easily assessed, but often also includes the volume of gas in transit, which should not be included in natural gas import and export statistics. Clearer guidance may be needed on how to record flows of natural gas that may involve temporary storage in the transit country, or the resale or redirection of natural gas in transit.

17. **Resources and reserves**. The availability of reliable information on reserves and resources of natural gas is of great importance for the assessment of national wealth. In many countries, such reserves and resources are a major contributor to national wealth, and their reliable measurement is the basis for assessments of the reliance upon and depletion of such resources. Internationally agreed definitions and classifications of resources and reserves of natural gas are fundamental to ensure the comparability of information. The System of Environmental Economic Accounts for Energy provides definitions and classifications based on the work of the United Nations Framework Classification for Fossil Energy and Mineral Resources. Further guidance on their implementation is expected to ensure uniform applications.

18. **Flaring, venting and reinjection during natural gas extraction**. While statistics on the primary production of natural gas exclude quantities concerning flaring, venting and reinjection during natural gas extraction, they are nonetheless important for environmental concerns. Statistics on flaring and venting are particularly important because of their impact on greenhouse gas emissions and are therefore generally reported separately.

19. **Statistical differences in balancing energy supply and demand**. The quality of gas statistics depends on how reliable, precise and consistent the collected gas data are. When data on the supply and use of gas are put together in an energy balance, high statistical differences might appear, which indicate errors in the basic statistics for gas. The possible reasons for such differences could be uncertainty in the gas data reported to the statistical offices or incomplete data coverage, for instance, when complete information on reinjection or consumption is not available in all countries. Methodological problems or differences are another possible explanation. Entities that compile statistics for production, exports, consumption, prices or value figures often use different data sources or data processing methods, which can lead to inconsistencies and discrepancies when data are put together and compared. Such problems can be avoided by following recommendations or technical guidance for the compilation of gas statistics.

20. **Prices of natural gas**. Natural gas prices are an important input for the construction of economic indicators and the assessment of the economic performance. In many cases, reliable and detailed data on such prices may be difficult to obtain. For analytical purposes, there is a need for information on the components of the different prices, which presents the challenge of correctly identifying the costs for transporting gas and of correctly adjusting the price according to the purpose of the statistics.

21. **Statistical confidentiality**. The issue of confidentiality in providing and releasing relevant data may arise in countries where there are few companies trading or supplying natural gas. In such cases, there is an issue of balance between the application of statistical confidentiality, as one of the fundamental principles of official statistics, and the need for public information and for complete information on the different flows related to natural gas required to draw up energy balances or energy accounts. Additional guidance may be needed on how to balance the respect for confidentiality with the need to preserve and increase the relevance of the statistics.

IV. Existing international activities in international energy statistics

22. Annual natural gas statistics are collected by a number of international and regional organizations, resulting in good coverage of the annual natural gas transactions of countries. Consistent implementation of the definitions and recommendations set out in the International Recommendations for Energy Statistics should further improve the comparability of different data sources.

23. The availability of monthly natural gas statistics varies considerably. Detailed monthly statistics are collected by the International Energy Agency and Eurostat as part of the monthly oil statistics questionnaire. There is also a well-established time series, in which statistics are comprehensively collected and presented for the month before last. Eurostat also collects natural gas data from member States and candidate countries of the European Union for the past month on such key flows as primary production, imports, exports, stock change, stock levels and calculated supplies of natural gas. In addition, Eurostat collects semestrial natural gas prices in the European Union at three levels of taxation, the various bands depending on the size of the industrial or household consumers. In 2007, the Asia-Pacific Economic Cooperation (APEC) began an experimental collection and publication of monthly natural gas data on natural gas production, consumption, trade and stocks. The Statistics Division collects monthly statistics on the production of natural gas through the Monthly Bulletin of Statistics. Some of the above-mentioned collections are based on legal directives, while others are carried out on a voluntary basis.

24. While there is increasing demand for short-term, detailed statistics on natural gas, the current situation shows a lack of detailed information on the supply and demand side on a monthly basis for countries that are not members of the Organization for Economic Cooperation and Development. This information is important in order to understand the market, plan future supplies and demand, and take decisions on investments.

V. Priority areas for future work on natural gas statistics

25. Based on the considerations described above, the Statistics Division, in coordination with other stakeholders in the area of energy statistics, is planning to focus on (a) the development of methodological guidelines; (b) data collection; and (c) training and technical assistance to countries.

26. The development of specific methodological guidelines for the collection and compilation of natural gas statistics, in line with the recommendations provided in the International Recommendations for Energy Statistics, is an important requirement for the improvement of such statistics. The Statistics Division, in cooperation with the Oslo Group on Energy Statistics and the London Group on Environmental Accounting, is preparing the Energy Statistics Compilers Manual, which aims to provide practical guidance in the implementation of the International Recommendations for Energy Statistics. As part of that work, special attention will be given to the collection and compilation of structural statistics on natural gas.

27. In line with the Statistics Division work plan endorsed by the Statistical Commission at its forty-second session, the Division is revising its annual

questionnaire on energy statistics to reflect the updated International Recommendations for Energy Statistics and to harmonize it with the questionnaire of the International Energy Agency, Eurostat and the Economic Commission for Europe, in order to reduce the burden of response and facilitate data exchange. As part of the revision, elements will be considered for the improvement of the availability and quality of natural gas statistics.

28. In response to the need for short-term, detailed natural gas statistics, the Statistics Division is cooperating with other international/regional agencies such as APEC, Eurostat, the International Energy Agency, the Latin American Energy Organization, the Gas Exporting Countries Forum and the International Energy Forum. While the International Energy Forum performs a coordination function, the other six agencies collect, on an experimental basis, monthly statistics on production, imports, exports, stocks, stock changes and gross inland deliveries of natural gas through the Joint Organisations Data Initiative gas questionnaire. An increasing number of countries submit such monthly data.

29. The Statistics Division, in cooperation with the organizations of the Joint Organisations Data Initiative, is preparing a manual to assist countries in the collection and compilation of monthly natural gas statistics. The manual will be produced in line with the International Recommendations for Energy Statistics and will further expand on specific issues related to the monthly collection of natural gas statistics. The Division plans to host an expert group meeting on the development of the manual for natural gas statistics to draw on the expertise of countries that successfully compile such statistics and can contribute to common guidelines.

30. Training and technical assistance activities to countries will be provided to familiarize countries with the guidelines in the International Recommendations for Energy Statistics, those developed in the context of the Energy Statistics Compilers Manual and those specifically relating to natural gas statistics. Training activities for natural gas statistics will be integrated as much as possible into existing or planned activities, such as regional workshops, training courses and internships.

31. Special attention will be paid to additional requirements and difficulties resulting from the need for statistics to be produced at a higher frequency, such as monthly natural gas statistics.

VI. Points for discussion

32. **The Commission is invited to:**

(a) **Endorse the proposed activities on natural gas statistics, specifically the development of detailed methodological guidance and the conduct of training activities;**

(b) **Endorse the establishment of a worldwide database on monthly natural gas statistics as described in paragraph 28 above and encourage countries to participate in the initiative.**